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VA-201M

Gas Monitor

USER'S MANUAL

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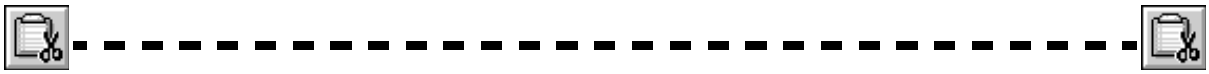
DR0015 December 2002

WARRANTY

Vulcain Inc. warrants to the original purchaser that its product, and the component parts thereof, will be free from defects in workmanship and materials for a period of one year from the date of purchase. Vulcain will, without any charge and at its option, repair or replace defective products or components upon their delivery to its Repair and Service Department.

This warranty does not apply in the event of misuse or abuse of the product, or as a result of unauthorized alterations or repairs. Vulcain shall not be liable for any consequential damages, including, without limitation, damages resulting from loss of use.

Every precaution for accuracy has been taken in the preparation of this manual. However, Vulcain neither assumes responsibility for any omissions or errors that may appear, nor liability for any damages that may result from the use of the products in accordance with the information contained in this manual.



Call Sales/Technical: 800-563-2967
Fax: (450) 632-9938

BEFORE RETURNING ANY INSTRUMENTS, PLEASE CONTACT US TO OBTAIN A RETURN OF MATERIAL AUTHORIZATION NUMBER.

To obtain warranty service, return the product, along with a complete description of the defect, transportation prepaid. Vulcain assumes no risk for damage in transit. Following warranty repair, the product will be returned to the buyer, transportation prepaid.

Warranty Registration

To validate the warranty, this registration form must be completed in full and sent to Vulcain within 90 days of the date of purchase.

Customer's name: _____
Address: _____
City: _____ State/Prov.: _____
Location of the installation: _____
Serial no.: _____

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UNPACKING

After opening the package, remove the equipment and components. Make sure that you have all the items described on the order form or packing slip.

DESCRIPTION

The **VA-201M-Series** is an advanced microprocessor-based system featuring a high quality stand-alone monitor, a unique high-tech enclosure, and all necessary characteristics to provide continuous, effective and fully integrated monitoring of toxic and combustible gases.

INSTALLATION GUIDELINES

Make sure to locate the monitor and sensing assembly(ies) in an area easily accessible to a technician.

Avoid any location where the monitor could be subject to vibrations.

Avoid any location close to noisy equipment.

Avoid any location where temperature variations occur rapidly.

Verify all the local requirements and existing regulations which may affect the choice of location.

For the DT Duct-Type housing, installation is recommended on a straight duct at least 3 feet (1 m) away from any curve.

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DETERMINATION OF NUMBER OF SYSTEMS

The number of transmitters required is determined by a unit's operational radius of surveillance. Using Table 1 below, the number of units required can be easily evaluated.

Table 1:

Gas Detected		Radius of Surveillance	Area Covered
CO NO_2	Carbon Monoxide Nitrogen Dioxide	50 feet (17 metres)	10,000 square feet (1,000 square metres)
Others		20 feet (7 metres)	1,600 square feet (100 square metres)

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SURFACE-MOUNT INSTALLATION

Installation of the monitor simply requires the physical mounting of the enclosure and connection of the power and output lines.

Table 2: Recommended Height

Detected Gas		Relative Density (air = 1)	Height
CO	Carbon Monoxide	0.968	1 - 1.5 m (3 - 5 feet) from floor
* NO_2	Nitrogen Dioxide	1.58 (cold)	30 cm to 1 m (1- 3 feet) from ceiling
H_2	Hydrogen	0.07	30 cm (1 foot) from ceiling
CL_2	Chlorine	2.50	30 cm (1 foot) from floor
NH_3	Ammonia	0.59	30 cm (1 foot) from ceiling
H_2S	Hydrogen Sulfide	1.19	30 cm (1 foot) from floor
HCL	Hydrogen Chloride	1.30	30 cm (1 foot) from floor
HCN	Hydrogen Cyanide	0.932	30 cm (1 foot) from floor
ETO	Ethylene Oxide	1.50	30 cm (1 foot) from floor
O_2	Oxygen	1.43	1 - 1.5 m (3 - 5 feet) from floor
SO_2	Sulfur Dioxide	2.25	30 cm (1 foot) from floor
R11 R12 R22 R123 R125 R134A	Refrigerants	5.04 4.20 3.11 5.27 4.14 3.52	30 cm (1 foot) from floor
COMB	Most combustibles are heavier than air, with the exception of methane, hydrogen, ethylene and acetylene. For gases that are heavier than air, sensors should be installed approximately 30 cm (1 foot) from the floor. For combustibles that are lighter than air, sensors should be installed 30 cm (1 foot) from the ceiling, close to the potential leak source.		

* May differ in certain applications. Hot NO_2 from exhaust systems is lighter than ambient air.

RANGE AND ALARM LEVELS

Table 3: Range and Alarm Levels

Gas Detected		Range	Alarm Level A	Alarm Level B
CO	Carbon Monoxide	0 - 250 PPM	35 PPM	200 PPM
NO_2	Nitrogen Dioxide	0 - 10 PPM	0.72 PPM	2 PPM
CL_2	Chlorine	0 - 15 PPM	0.5 PPM	1 PPM
NH_3	Ammonia	0 - 100 PPM	25 PPM	35 PPM
H_2S	Hydrogen Sulfide	0 - 50 PPM	10 PPM	15 PPM
HCL	Hydrogen Chloride	0 - 50 PPM	3 PPM	4 PPM
HCN	Hydrogen Cyanide	0 -50 PPM	5 PPM	9 PPM
ETO	Ethylene Oxide	0 - 10 PPM	1 PPM	5 PPM
O_2	Oxygen	0 - 25% Vol.	19.5% Vol.	22% Vol.
SO_2	Sulfur Dioxide	0 - 10 PPM	2 PPM	5 PPM
R-123	Refrigerant	0 - 1000 PPM	50 PPM	500 PPM
R-11 R-12 R-22 R-125 R134A	Refrigerants Q1 Q2	0 - 1000 PPM 0 - 2000 PPM	250 PPM 1000 PPM	500 PPM 2000 PPM
Combustibles		0 - 100% LEL	25% LEL	50% LEL

When the level of alarm has been reached, the corresponding relay will remain activated for a minimum of 59 seconds.

A different alarm level may have been programmed in order to satisfy the constraint of a particular application.

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DUCT-TYPE INSTALLATION

The VA-201M can be duct-mounted. It is most efficient when air speed is between 500 and 4,000 ft/minute (2.5 to 20.3 m/sec), and can be installed either for fresh air or exhaust monitoring. Make sure to verify all the requirements and existing regulations which may affect the choice of its location. We recommend installation on a straight duct at 1 m (3 feet) away from any curve.

1. Post the drilling guide to the ventilation duct.

2. Drill the openings for the sampling tubes.

3. Insert the sampling tube with lateral air holes in the appropriate connector, orienting the air holes facing airflow. Tighten with the (8-32 5/16") screw on the connector.

4. Insert the exhaust tube into the appropriate connector, orienting the slant away from airflow. Tighten with the (8-32 5/16") screw on the connector.

5. For a ventilation duct longer than 20 inches (51 cm), extra tubing is necessary. It is preferable to drill a hole at the opposite side facing the detection unit to support the far end of the tube. Seal the end of the tube with the cork supplied. If necessary, seal the openings on the duct around the tubings.

6. Install the box on the duct.

7. Connect the power and the outputs as shown in the **ELECTRICAL WIRING** section.

8. Before mounting the cover of the sampling unit box, start the ventilation feeding fan and check if there is any leakage. If necessary, seal with air plugs.

9. The cover should be mounted using metallic screws (6/32 1/2").

To convert from CFM to velocity (ft/minute), divide the flow by the area.
Example: In a 2 ft X 4 ft duct, where the area is 8 ft^2 and a CFM of 40,000, the air velocity will be 40,000 ft^3/minute/(8 ft^2) = 5,000 ft/minute

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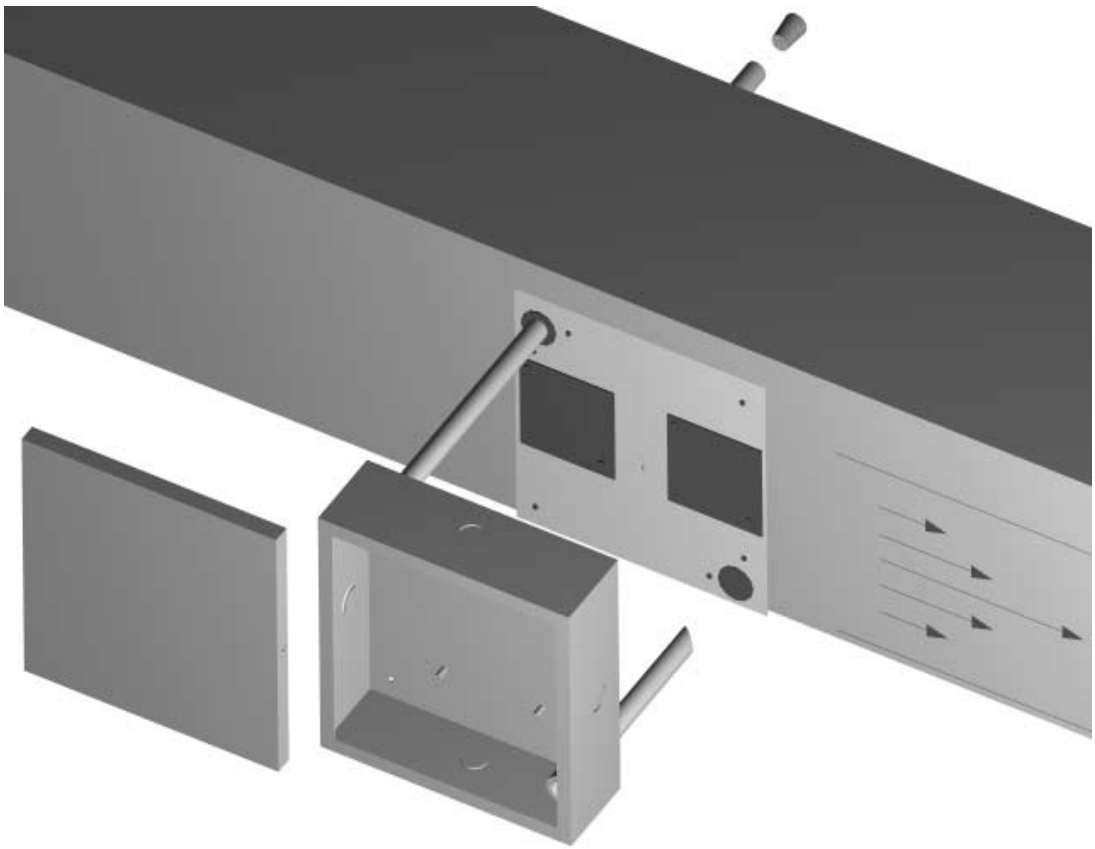
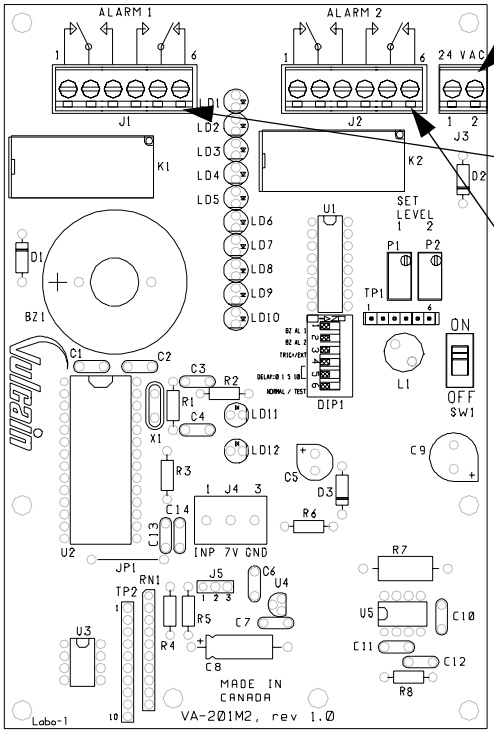
DUCT-TYPE MOUNTING DETAILS



ELECTRICAL WIRING



Power Supply: Input J3
17 to 27 Vac, 24 to 38 Vdc, 250 mA

Relay First Level: Output J1, 5 A, 30 Vdc or 250 Vac (resistive load)

Relay Second Level: Output J2, 5 A, 30 Vdc or 250 Vac (resistive load)

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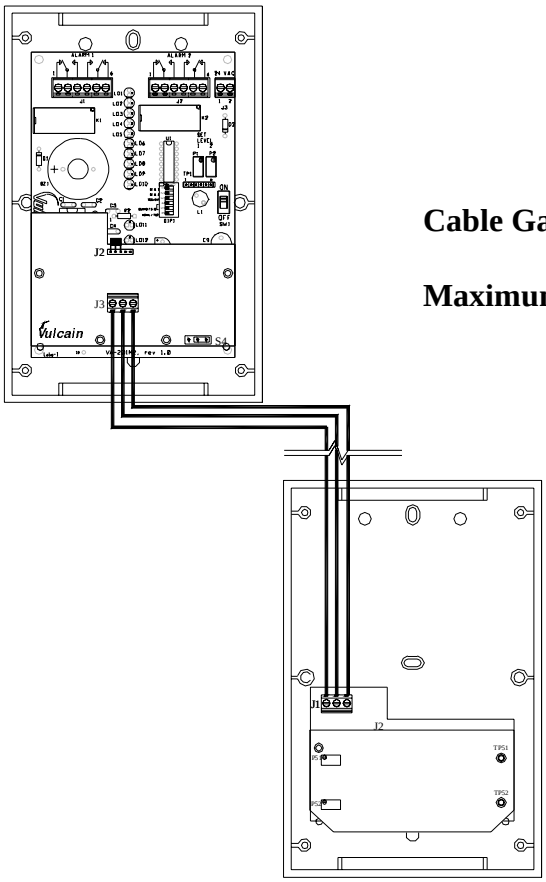
REMOTE SENSOR CONFIGURATION (Optional)

Master Board



Cable Gauge: 18 AWG

Maximum Length: 100 feet (30 m)

Remote Sensor Assembly

SPECIFICATIONS

Power Requirements	17 - 27 Vac, 24 - 38 Vdc, 250 mA
Operating Temperature Range	32^{o}F to 100^{o}F (0 to 40^{o}C)
Operating Humidity Range	0 to 95% RH (non-condensing)
Outputs	2 DPDT optional relay 5A, 30 Vdc or 250 Vac (resistive load)
Dimensions	8.4 in(H) x 5.3 in(W) x 2.25 in(D) (21.3 cm x 13.4 cm x 5.7 cm)
Weight	0.77 lbs (0.350 kg)

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PERIODIC INSPECTIONS AND CALIBRATION

Calibration should be performed twice a year. More frequent calibration may be necessary for units operating under extreme conditions or exposed to contaminants or gas concentrations greater than the lower explosive limits. A calibration inspection must be included as part of routine maintenance to ensure proper operation of the gas detection unit.

If unit span or zero cannot be adjusted, the sensor may be approaching its end-of-life or has been contaminated and must be replaced.

USER INTERFACE

After powering ON the monitor, the first 2 red LEDs will blink for 2 minutes during the warm-up period, followed by the green LED indicating normal operation.

The yellow LED indicates a system failure. If this situation occurs, you should contact your local representative for further assistance.

Each red LED represents 10% of the scale. For example, an oxygen depletion monitor reading 21% will light 8 red LEDs.

When the gas concentration reaches the first alarm level (Alarm A), the second red LED from the top blinks and the first level relay is activated.

If the gas concentration reaches the second alarm level (Alarm B), the first red LED from the top will blink. The second level relay and audible alarm are activated.

When the gas concentration exceeds the scale, all red LEDs flash ON and OFF.

For oxygen depletion detection only, the first level relay and audible alarm are activated when the concentration exceeds 22.0% and is less than 19.5%. In this case, relay 2 is never activated.

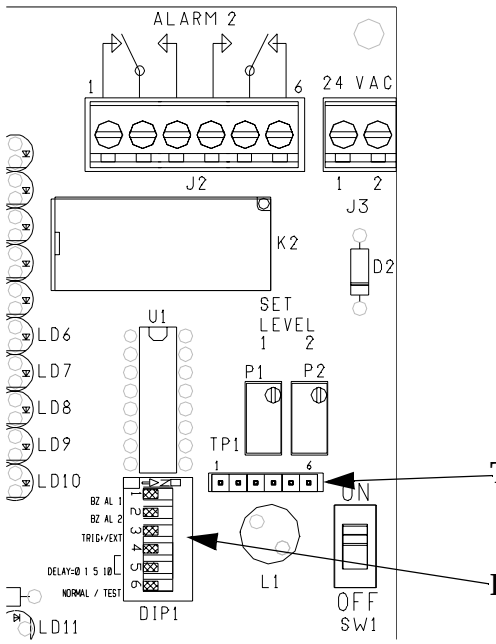
Stabilization time depends on the type of sensor used. Typically, most of the VA-201M-Q1 Series stabilize within a few minutes, except for HCL, HCN and ETO units which stabilize fully in 7 days.
VA-201M-Q2 Series and VA-201M oxygen units will need a minimum of 24 hours before reading within their specifications.

TESTING PROCEDURE

Flow a Span gas at the recommended rate and observe the action of the LEDs and analog outputs. Span gas can be purchased through your local representative.

ADJUSTMENTS

The VA-201M comes as plug and play out of the box. Field adjustement is possible. All adjustments are factory set. If required, consult the additional information below for verification of the time delays and relay output.



TP1: For Relay Adjustment

DIP1

TIME DELAYS

Switch 4 and 5 of DIP1 determine the time delay set prior to and after activation of the alarms.

Table 4: Time Delay Settings on DIP1

	0 Min	1 Min	5 Min	10 Min
Switch 4	OFF	OFF	ON	ON

Table 4: Time Delay Settings on DIP1

	0 Min	1 Min	5 Min	10 Min
Switch 5	OFF	ON	OFF	ON

RELAY OUTPUTS

The relay outputs are set at alarm levels based on the type of gas to be detected. Table 3 on page 6 indicates the alarm levels.
The alarm level settings can be modified as follows:

FIRST LEVEL (Alarm A)

Connect a voltmeter to TP1 Pin 3 (+) and Pin 6 (-).
Adjust P1 to Vdc = (Alarm level A x 4/scale of reading)
Example for a VA-201M-CO:
Vdc = (35 x 4/250) = 0.56 Vdc

SECOND LEVEL (Alarm B)

Connect a voltmeter to TP1 Pin 2 (+) and Pin6 (-).
Adjust P1 to Vdc = (Alarm level B x 4/scale of reading)
Example for a VA-201M-CO:
Vdc = (200 x 4/250) = 3.2 Vdc

DETECTION PARAMETERS

Table 5:

Alarm A	Actions	Alarm B	Actions

OPTIONAL DISPLAY

An LCD display is available in order to visualize the gas concentration directly on the monitor. Toxic gases appear in parts per million, flammable gases in percentage of lower exposure limit, and oxygen in percentage per volume.